

*California Environmental Protection Agency*  
**AIR RESOURCES BOARD**

## **California Renewable Electricity Standard**

**Public Workshop**  
**April 5, 2010**  
**Noon to 3:00 P.M.**

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### **Overview of Presentation**

- Background
- Possible Compliance Scenarios Analysis
- Methodology for GHG and Air Quality (AQ) Analysis
- Preliminary Results of GHG and AQ Analysis
- Next Steps



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## **Background - AB 32 Requirements**

- Section 38562:
  - ✓ Be equitable
  - ✓ Ensure activities do not disproportionately impact low-income communities
  - ✓ Complement and do not interfere with air quality or toxic emission standards
  - ✓ Consider overall societal benefits



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## **Background – Additional Requirements**

- Section 38570:
  - ✓ Consider direct, indirect, localized and cumulative emission impacts
  - ✓ Design market-based compliance mechanism to prevent emissions increase
  - ✓ Maximize environmental and economic benefits

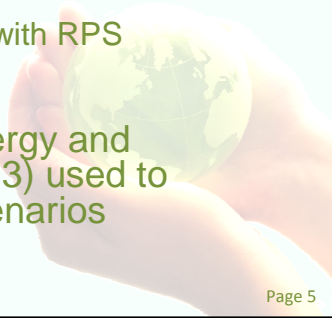


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## **Possible Compliance Scenarios Analysis**

- Possible Compliance Scenarios
  - ✓ Mix of resources used to comply with 20% RPS
  - ✓ Mix of resources used to comply with 33% RES
- 20% RPS Scenario
  - ✓ RPS with 20% renewable resources in 2020
- 33% RES Scenario
  - ✓ 33% renewable resources in 2020 with RPS requirements
- RES Calculator developed by Energy and Environmental Economics, Inc. (E3) used to generate possible compliance scenarios



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## **Methodology**

- Both possible compliance scenarios examine LOW Load and HIGH Load forecasts
- LOW Load Forecast
  - ✓ Includes AB 32 Scoping Plan measures
- HIGH Load Forecast
  - ✓ Excludes AB 32 Scoping Plan measures



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## **Methodology (cont)**

- GHG emission factors are based on ARB's analysis entitled "Evaluation of Greenhouse Gas Benefits for Renewable Energy Technologies"
- GHG emission estimates include all areas within the Western Electricity Coordinating Council (WECC) that supply power to California
- Hydro power, wind, solar thermal, solar PV and landfill/digester gas are all assumed to have negligible GHG operating emissions

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## **Methodology (cont)**

- Emission factors for criteria pollutants are based on historical emission data and environmental impact reports
- Criteria pollutant emission estimates include all emissions occurring in California

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## **Electricity Retail Sales in 2008 & Projections for 2020**

- 2008 Retail Sales = 262,000 GWh
- 2020 Retail Sales
  - ✓ Based on 2009 IEPR Projections
  - ✓ Low Load = 251,000 GWh
  - ✓ High Load = 289,000 GWh



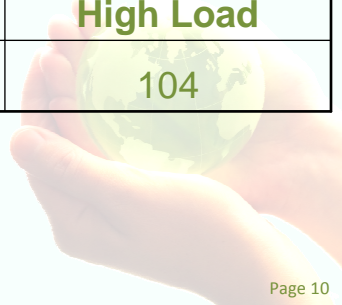
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## **Preliminary Results - GHG Emissions from 20% RPS Scenario**

**WECC-Wide (MMTCO<sub>2</sub>e/yr)**

<b>2008 Emissions</b>	<b>20% RPS in 2020</b>	
	<b>Low Load</b>	<b>High Load</b>
103	85	104



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## **Preliminary Results - GHG Emissions from 20% RPS Scenario vs. 33% RES Scenario**

**WECC-Wide (MMTCO<sub>2</sub>e/yr, 2020)**

<b>Scenarios</b>	<b>Low Load</b>	<b>High Load</b>
<b>20% RPS</b>	85	104
<b>33% RES</b>	65	81
<b>Emission Reduction</b>	20	23

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## **Preliminary Results – Comparison of 2008 vs. 20% RPS Scenario, Low Load**

	<b>Statewide (tons/yr)</b>			
	<b>NO<sub>x</sub></b>	<b>SO<sub>x</sub></b>	<b>CO</b>	<b>PM<sub>2.5</sub></b>
<b>2008</b>	15,200	1,980	22,200	2,970
<b>2020, 20% RPS</b>	13,900	1,850	20,100	2,950

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### **Preliminary results – Comparison of 20% RPS Scenario vs. 33% RES Scenario, Low Load**

Scenarios	Statewide (tons/yr, 2020)			
	NO <sub>x</sub>	SO <sub>x</sub>	CO	PM <sub>2.5</sub>
<b>20% RPS</b>	13,900	1,850	20,100	2,950
<b>33% RES</b>	12,500	1,750	19,100	2,860
<b>Emissions Reduction</b>	1,400	100	1,000	90
<b>Percent Reduction</b>	10	5	5	3

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### **Preliminary Results – Comparison of 2008 vs. 20% RPS Scenario, High Load**

	Statewide (tons/yr)			
	NO <sub>x</sub>	SO <sub>x</sub>	CO	PM <sub>2.5</sub>
<b>2008</b>	15,200	1,980	22,200	2,970
<b>2020, 20% RPS</b>	15,600	2,190	22,600	3,400

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### **Preliminary results – Comparison of 20% RPS Scenario vs. 33% RES Scenario, High Load**

Scenarios	Statewide (tons/yr, 2020)			
	NO <sub>x</sub>	SO <sub>x</sub>	CO	PM <sub>2.5</sub>
<b>20% RPS</b>	15,600	2,190	22,600	3,400
<b>33% RES</b>	14,200	2,010	21,500	3,320
<b>Emissions Reduction</b>	1,400	180	1,100	80
<b>Percent Reduction</b>	9	8	5	2

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### **Next Steps**

- Finalize preliminary results presented today
- Analyze other possible scenarios based on RES Calculator
- Evaluate toxic air contaminants and cumulative impacts
- Evaluate regional and community air quality impacts
- Work with consultant to analyze non-air impacts

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# Questions / Comments

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